

## Graphing Quadratic Equations

**Directions:** Open the file Quad\_Int\_Vertex\_Form\_worksheet[1] Then use this file to manipulate the graph and draw conclusions. As you do this answer the questions below.

$$y = ax^2 + bx + c$$

### The effect of **a** on the graph

1. What happens as a increases?
2. What happens as a decreases?
3. When the value of a is positive what is ALWAYS true about the parabola?
4. When the value of a is negative what is ALWAYS true about the parabola?

### The effect of **b** on the graph

1. What happens as b increases?
2. What happens as b decreases?
3. As you move b from most negative to most positive what shape does the vertex draw?

### The effect of **c** on the graph

1. What happens as c increases?
2. What happens as c decreases?
3. As you move c from most negative to most positive what shape does the vertex draw?

## The axis of symmetry

1. Recall from Geometry: What is line symmetry?
2. Does a parabola have line symmetry?
3. What type of line symmetry does it have?
4. This line has a special name. It is called the axis of symmetry. Follow the steps below to find out how you can find the axis of symmetry.
  - a. Select View -> Algebra Window
  - b. Right Click on d: x = ...
  - c. Choose Show Object
5. This is the axis of symmetry. Play with a, b, and c and watch what happens.
6. The axis of symmetry can be found by using the following equation.

a.  $x = \frac{-b}{2a}$

7. Find the equation for the axis of symmetry for the four quadratic equations below. SHOW YOUR WORK!!!!

a.  $y = 2x^2 + 8x - 4$

X =

WORK:

b.  $y = 5x^2 + 3x + 7$

X =

WORK:

c.  $y = 3x^2 - 6x + 9$

X =

WORK:

d.  $y = -x^2 - 3x + 4$

X =

WORK:

8. Use the internet to find the definition of the vertex of a quadratic equation. Write your definition below.

9. What line do you KNOW will pass through the vertex of a quadratic equation?

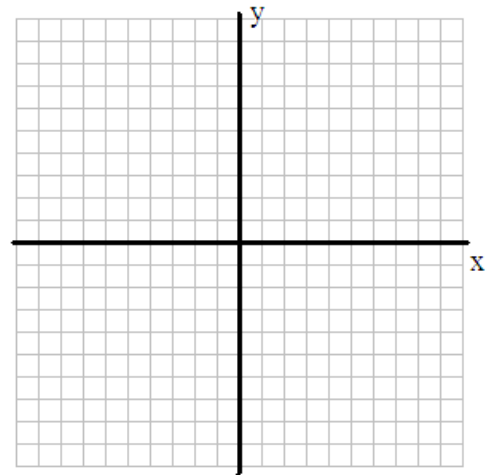
10. So the x-coordinate of the axis of symmetry is \_\_\_\_\_.

11. If you know the x-coordinate of the vertex, how could you find the y-coordinate?

12. Find the vertex of the following four quadratic equations; place that value in the center of the table and then find two points on the parabola to the left of the vertex and two points to the right of the vertex. Lastly, plot the points and sketch the parabola.

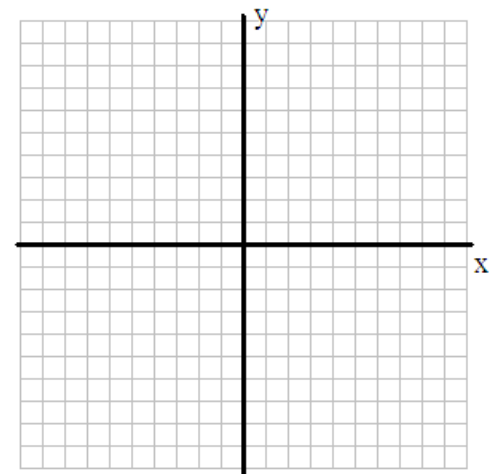
a.  $y = 4x^2 + 2x - 4$

x					
y					



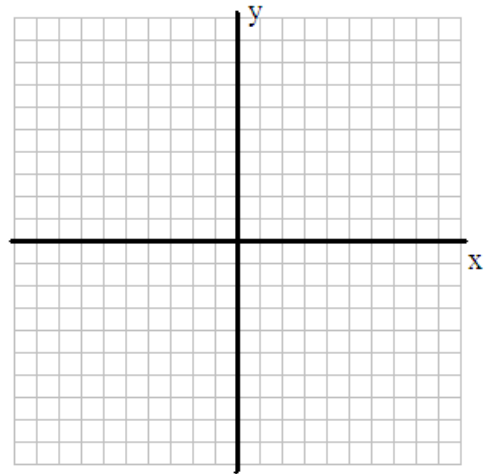
b.  $y = 6x^2 + 2x + 7$

x					
y					



c.  $y = 3x^2 - 18x + 9$

x					
y					



d.  $y = -4x^2 - 8x + 4$

x					
y					

